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ABSTRACT

The development of environmental process measures marks a significant step forward in the assessment of environment quality. As Bloom (1964) predicted, these measures have made it possible to more clearly delineate the relationship between environment and development. Although factorial structure of many process instruments is open to question, there is evidence of substantial empirical validity for most. Greater attention now needs to be paid to establishing the validity of process instruments for specific purposes such as screening, diagnosis, and program evaluation. Environmental process measures have been used with a variety of age and cultural groups. Most of the studies done outside the United States were not reported in this paper. Adaptations of instruments for use with other groups should be made with caution with emphasis given to establishing the appropriateness of each item for use with a particular age group in a particular social context. While much additional work needs to be done in developing good environmental process measures, it is concluded that these measures can be usefully employed for a variety of research and applied purposes. Particular attention should be given to designing short, easy to administer instruments for use in educational and clinical settings. Significant improvements in research instruments may be more dependent on the development of more adequate theories about the relationship between environment and development. In both cases, the use of environmental measures is likely to make a substantial contribution to the adequacy of the information obtained. (Author/RC)

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ASSESSING THE DEVELOPMENTAL ENVIRONMENT OF YOUNG CHILDREN

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In contrast to the large array of instruments available for the measurement of individual differences in children, there are relatively few techniques available which precisely measure a child's developmental environment. Traditionally, social class or socioeconomic status designations have been employed as indices of environmental quality. However, such an index is generally too imprecise, a form of measurement to serve as an effective guide for intervention strategies. It is also to improcise a construct to provide an adequate explanation of the relationship between environmental quality and human behavior. Increasing attention is now being given to the development of sensitive measures of specific environmental processes in an effort to dileneate critical aspects of the developmental environment. Among these processes are parental teaching style, response contingencies in the home, provision of play materials, encouragement of achievement and parental language usage.

It was perhaps inevitable that educators and social scientists would become dissatisfied with status variables like income and education as measure of environmental quality. In the first place, these rather gross measures mask a considerable amount of within class variability. For example, Littman, Moore, and Pierce-Jones (1957) found a very wide range for all types of behavior within both middle and lower-class samples. They concluded that differences in behavior within each social class group completely overshadowed any slight mean difference existing between the two social class groups. Dramatic differences in parental and child behavior among representatives of the "lower" class were likewise reported by Malone (1963) and by Pavenstedt (1965).

In sum, the literature on social class and SES differences has traditionally paid insufficient attention to the extensive intraclass variation found in most studies. Moreover, the literature often ignores the fact that statistically significant between-class differences are frequently of small magnitude. Benjamin Bloom (1964) reasoned the use of general indices of social status or social class obscures many of the important differences among environments, in much the same way that the

use of I.Q. scores masks many of the important differences among individuals.

A number of researchers have stressed that SES should not be viewed as a unitary variable, but rather as a conglomerate (Deutsch, Katz, & Jenson, 1968; and Caldwell, 1968). Thus, the search for SES-development relationships amounts to the dissection out of the SES matrix of certain component variables which can be related to certain developmental skills. For example, a statement to the effect that low SES is highly correlated with low reading skills tells very little about the aspects of life in low SES homes which mediate this relationship. Further, it leaves us bewildered when we try to explain the outstanding reading performance which is sometimes found in children from low SES homes.

A second reason for the dissatisfaction with social status measures is that they have failed to explain a sufficient amount of the variability in academic achievement or intelligence test scores. As Bloom (1964) noted, social class rarely accounts for more than 25% of this variance. Marjoribanks (1972) reports an investigation of 185 eleven-year old English boys and their parents. Parents were given an interview measure of 8 environmental press variables. The boys were administered the Primary Mental Abilities Test. The environmental press variables accounted for a significant amount of variance in boys abilities beyond that attributable to social status and family structure variables.

In defense of social status it should be noted that findings from hundreds of research investigations establish it as an important variable in the study of parent and child behavior. In retrospect these investigations appear to have laid the groundwork for more analytic, process-oriented examinations of the developmental environment and its effects. The remainder of this paper is devoted to descriptions of several of the major efforts to develop environmental process measures. An attempt will also be made to summarize and critique the efforts to date.

The Chicago Approach

The past decade has witnessed several major attempts to develop sensitive measures of environmental quality. Benjamin Bloom (1964) and his colleagues at the University of Chicago were pioneers in this effort.

Wolf (1964), one of Bloom's students, summarized what may be called the "Chicago Approach" to the measurement of environment by stating that an environment should not be conceptualized as a single entity. He postulated that a single physical environment may be made of a number of sub-environments. Each sub-environment could operate to influence the develcpment of a specific human characteristic. With this rationale, he attempted to identify and measure the following environmental process variables presumed to be related to the development of intelligence: stimulation provided for intellectual growth, opportunities provided for an emphasis on verbal development, and the provision of opportunities for general types of learning in a variety of situations. For each variable, Wolf developed a list of process characteristics consisting of specific behaviors of parents and others in the home. The efforts culminated in an interview form of about sixty items. Wolf interviewed mothers of sixty fifth-grade students. The mothers were selected by stratified random sample from each social class. I.Q. data on the students were also obtained, Wolf found that the correlation between his rating of the quality home of the environment and the child's measured general intelligence was .69.

Dave' (1963), another of Bloom's students, employed data gathered from interviewed with the same group of mothers. In Dave's study, mothers were rated on six process dimensions: achievement press, language models in the home, academic guidance provided in the home, stimulation provided in the home to explore various aspects of the larger environment, intelligence interests and activities in the home, and work habits emphasized in the home. Children were given both achievement and I.Q. tests. The home environment rating had a correlation of .80 with the total achievement battery score administered at the end of fourth grade and .60 with I.Q.

Results from the Dave' and wolf studies led Bloom (1964) to conclude that parents with relatively low levels of education or occupational status can, nonetheless, provide very stimulating home environments. The Wolf and Dave' scales have been modified over the years and have led to the development of a number of variations (e.g. the Cognitive Home Environment Scale (Radin, 1968), and the Home Information Scale (Landsberger, 1973).

Marjoribanks (1972) has also relied heavily on the leadership of the Chicago group in developing a measure of the home learning environment. His instrument is designed to assess eight environmental press areas: achievement, activeness, intellectuality, independence, English language usage, second language usage, mother dominance, and father dominance. This instrument is in the form of a 188 item six-point rating scale. It is designed to be used as a semi-structural interview to elicit responses from parents in their homes. Psychometric data available on this instrument (Walberg and Marjoribanks, 1973) indicate that it has satisfactory concurrent validity and a reasonable factorial structure. Marjoribanks used the instrument to explore the relationship of different types of home environment to different patterns of mental abilities in 185 eleven-year old boys. Each boy was given the Primary Mental Abilities subtests. The environmental measure accounted for a large percentage of the variance in verbal, number, and total ability scores and a moderate amount of the variance in reasoning ability scores.

The Fels Research Institute Approach

Among the earliest attempts to assess meaningful aspects of the early learning environment was the Parent Behavior Rating scales developed for the Fels Longitudinal Study (Baldwin, Kalhorn & Breese, 1945). Mothers were observed in the home at regularly scheduled intervals and their behavior rated on 30 process dimensions. Those dimensions were reduced to 10 through a series of factor analyses: adjustment of the home, restrictiveness of regulations, severity of actual penalities, clarity of the policy of regulations and enforcement, coerciveness of suggestion, acceleration attempts, general babying, general protectiveness, direction of criticism, and affectionateness. Several investigations of relations among these maternal variables and

children's cognitive behavior have been made (Kagan & Moss, 1962; Kagan & Freeman, 1963; Crandall & Battle, 1970; and McCall, Appelbaum & Hogarty, 1973). In general, the studies have shown a positive relation between child competence and parent behavior. Relations differ somewhat depending on the sex of the child, the age at which the maternal behavior occurs, and the age at which IQ is measured. McCall, Appelbaum & Hogarty (1973) also found that home environment as measured by this instrument was related to increasing and decreasing IQ profiles for children between 2 and 17 years of age.

The Institute of Developmental Studies Approach

Martin Deutsch and his colleagues, working under the auspices of New York University's Institute of Developmental Studies, became interested in the isolation of environmental variables related to intelligence. A statement by Deutsch, Katz, and Jensen (1968) delineated this group's position:

> In the past, most of the social-class variables examined, such as income, education, and physical condition of the home, were essentially nonpsychological in nature and, thus, did little to expose the causal factors underlying observed differences in the measured intelligence of poor and affluent children

Whiteman, Brown, and Deutsch (1967) set out to identify specific home background variables related to the development of linguistic and cognitive skills in 165 fifth-grade and 127 first-grade black and white children. Their sample was drawn from 12 schools in New York City and included children from various social levels. They delineated 15 factors suspected of being related to school success and SES. Included were motivational variables such as the amount of schooling the parent desired for the child, family variables such as father absence, exposure to experience variables such as school history, and activities with adults. After several correlational analyses, they compressed the list into six relatively independent variables which they put together to form a Deprivation Index. The multiple correlation relating the six variables of the Deprivation Index to reading was .49 for the fifth-grade level. Whiteman and Deutsch (1967) also found that scores on the Deprivation Index were related to gains and losses in IQ with age.

The Harvard Pre-School Approach

In the mid-sixties White, Carew, and their colleagues instituted a project at Harvard which had as one of its major purposes the discovery of ways that the environments and experiences of highly competent and less competent children differ in early childhood. As part of this research, Carew attempted to describe the role of the child's human and physical environment and to explain how the environment related to the development of competence. Four instruments were consequently developed to help in this endeavor (Watts, Barnett, and Halfar, 1973): (1) the Human Interaction Scale, (2) the Object Interaction Scale, (3) a Typical Day Questionnaire, and (4) an assessment of the mother's personality, background, responsibilities, and values.

With these instruments, members of Carew's research team studied the environments of two contrasting groups of children. One group consisting of 25 one- and two-year-olds were predicted to be competent. The prediction was based on the fact that they had a competent older sibling. The second group was composed of 15 one- and two-year-olds who were, on the basis, expected to perform poorly. The environments of these two groups of children were subjected to careful study until the children reached three years of age. Several differences in the roles played by parents and other key people comprising the human environment of well-developing, as contrasted with poorly developing children were observed: the sheer quantity of interaction was greater; more time was spent with the children in intellectually valuable activities; participation in the activity was not common; and intellectually valuable activities received more overt encouragement. In addition, parents of competent children encouraged their children more and were more often successful in controlling them. These characteristics were found to be related to the well-developing child regardless of the family's social class standing.

The Syracuse Approach

Caldwell and her colleagues working on the Syracuse Early Learning Project began early in 1964 to devote considerable effort to the development of ways of assessing the subtle aspects of the young child's home environment which might

"carry" the class influence (Caldwell, Heider, and Kaplan, 1966). That is, an attempt was made to probe beneath the surface of the social class concept and try to determine which specific features of it were most likely to influence cognitive development. Caldwell felt it was imperative to develop a sensitive measure of the home environment which could warn of developmental risk during the preschool years. Indeed, Blocm's conclusion, "that variations in the environment have greatest quantitative effect on a characteristic at its most rapid period of change," provided an excellent rationale for this endeavor, since these early years are typically such a period of rapid cognitive growth.

The instrument developed is called Home Observation for Measurement of the Environment (HOME). It is administered by having a person go to the home at a time when the child is awake and can be observed in interaction with mother or a primary caregiver. Most of the items include material based totally on observation. However, in order to cover certain important transactions not likely to occur during the visit, about one-third of the items are based upon parental report.

The HOME Inventory has been through 2 major revisions. The present instrument is composed of 6 subscales: (1) emotional and verbal responsivity of mother, (2) avoidance of restriction and punishment, (3) organization of physical and temporal environment, (4) provision of appropriate play materials, (5) maternal involvement with child, (6) opportunities for variety in daily stimulation. Although, the 6 subscales of HOME are not totally independent, factor analytic procedures were employed as a means of clustering the 45-items. Item analyses indicate that the Inventory is reliable. Subscales of HOME show low to moderate correlations with SES indices.

Numerous studies with the HOME have been conducted at the Center for Early Development and Education in Little Rock, Arkansas. Results of these investigations may be summarized as follows. Six-month HOME scores showed low but significant relationships to both six-month and twelve-month Bayley MDI scores. Six-month HOME

scores showed moderate to strong correlations with 54-month Binet performance. Twelve-month HOME scores showed low to moderate relationships with 12-month Bayley MDI performance and moderate to strong relationships with 36-month Binet scores. Finally, moderate to rather high correlations were obtained between 24-month HOME scores and both 36-month and 54-month Binet scores. The total HOME score at 24-months shared about 50 percent common variance with 36-month Binet scores and about 40 percent with 54-month Binet scores (Elardo, Bradley & Caldwell, 1975; Bradley & Caldwell, 1976, in press). Discriminant functions composed of HOME sub-scale scores recorded when the child was 6-months of age appeared to be fairly sensitive in predicting retardation (less than 70 I.Q.) at 3 years and in specifying average to superior performance (greater than 90 I.Q.) at 3 years (Bradley & Caldwell, 1977, in press) in specifying. Discriminant functions composed of HOME sub-scale scores recorded when the child was 6-months old were also successfully used to designate those infants who increased in mental test performance between 6-months and 3 years, those who remained stable, and those who decreased (Bradley & Caldwell, 1976) In a similar study, Elardo, Bradley & Caldwell (1977, in press) observed that 12-month and 24-month HOME scores showed moderate to strong correlations with 37-month scores on the Illinois Test of Psycholonguistic Abilities.

Several types of evidence pertaining to the construct validity of the HOME Inventory have been developed by researchers not connected with the Little Rock project. Ramey, Mills, Campbell and O'Brien (1975) reported that the HOME Inventory successfully discriminated between "normal" homes and homes "at risk" for developmental retardation. The Creavioto and DeLicardie (1972) study indicated that clinical malnutrition at 4 years of age was associated with low HOME scores at 6-months of age. That is, identified as malnurished tended to live in homes with little support for cognitive and social development both prior to the time that the children were identified as malnurished and also during the child's recovery from malnurishment. Wulbert, Inglis, Kriegsmann and Mills (1974) found that children who were language delayed but of normal intelligence came from homes having a poorer quality of stimulation (as reflected by HOME scores) than did normal children or Down's Syndrome children. An

investigation by Wachs, Uzgiris, and Hunt (1971) showed that early environmental stimulation (as measured by a slight modification of the HOME) was related to cognitive development as measured by the Infant Psychological Development Scale.

VanDoorninck, Caldwell, Wright, and Frankenburg (1975) found that 12-month HOME scores were more efficient predictors of school status than were SES indices. One final indication of the construct validity of the Home Inventory comes from a study on the effects of an early intervention program (Hamilton, 1972). The program included full day care for infants and education in child development, family management, employment difficulties and self confidence for parents. Many mothers also received direct training in child care. The HOME scores of participants showed a dramatic 15 point increase after six months involvement.

Other Approaches

In addition to the major efforts to develop measures of the early environment just described, there have been several other attempts. Among them are instruments developed for the Berkeley Growth Studies (Schaefer, Bell & Bayley, 1959; and Bayley & Schaefer, 1964), for the Berkeley Guidance Studies (MacFarlane, 1938; and Honzik, 1967), for the National Institute of Child Health and Human Development (Yarrow, Rubenstein, Pederson & Janowski, 1973) and for the Center for the Study of Human Development in London (Moore, 1968). Performance on these instruments has also shown substantial relations to measures of cognitive development.

Content of Environmental Measures

Because of the growing list of environmental process measures, it is difficult to make generalizations about the content of the various instruments. In general, the instruments reviewed differ considerably both in terms of the "intensity" with which specific process variables are examined and the "extensity" of the variables included. For example, the Human Interaction Scale developed by White and Carew of Harvard involved a very detailed analysis of the interactions between mother and child. By contrast, the Deprivation Index designed by Deutsch paid scant attention

to these variables. Similarly, scales such as the one developed by Marjoribanks contained many items and covered a large array of environmental processes. The one prepared by Moore for the London study was composed of relatively few items and assessed only for process characteristics.

Most environmental process measures give at least some attention to child-rearing and social interactions such as use of language and apparent efforts as accelerating achievement. Up to now the primary emphasis has been devoted to assessing those direct inputs provided to the child by caregivers. That is, the instruments have measured relatively specific parental behaviors. However, some scales have relied on an assessment of indirect inputs to the child such as parent attitudes and expectations.

Many environmental measures contain items assessing the inanimate or physical environment. Most of these focus on books, toys, and other materials directly connected with achievement. The Object Interaction Scale designed by Watts et al. (1973) is one of the few instruments which catalogues objects not directly connected with achievement. It is also one of the few instruments which attempts to assess how objects might impede as well as facilitate development of the scales reviewed none appeared to assess spatial and color configurations even though there is evidence that these configurations are related to learning.

Some of the scales examined included references to activities as well as more specific interactions. Most of the activities centered in the home; relatively few were conducted in other social contexts.

Existing environmental measures are perhaps as notable for what they <u>do not</u> contain as for what they <u>do</u> contain. For example, few process instruments have included detailed assessments of parental reinforcement style or of parental teaching style such as were used in the Hess and Shipman (1965) studies. Also, relatively little attention has been given to parental modeling behaviors (i.e., energy level, initiative, learning style, task orientation, social adaptation, interpersonal skills, etc.). In addition, little stress has been placed on the behavior of household members other than parents or primary caregivers.

In the context of examining the content of environmental process measures, it is worth noting that particular environmental stimuli may not be equally potent influences on child growth at each stage of cognitive development. In designing future environmental instruments, it might be fruitful to use IQ tests as a model for scale construction. That is, at each developmental level somewhat different environmental events should be included. Selection of events for each level should be based on their importance for development at that level.

To a great extent process measures of environmental quality have included items based on empirical studies of the relationship between environmental stimulation and children's development. To a lesser extent, developmental and learning theories have provided a partial basis for item construction. In only a few instances have scales been previously derived from a theoretical base (eg. Marjoribanks, 1972). Among existing developmental theories, Murray's (1938) need-press theory has been most frequently used as a source for items. The theories of Barker, Wright and their colleagues (cite) have also provided a model for some scale construction. At present no theory seems adequate as a sole basic for designing environmental process measures. Nor is there a taxonomy of environmental events which can serve as a model for scale construction. Thus, for the immediate future it seems likely that scales will remain largely empirically based.

Format of Environmental Measure

The environmental scales examined differed somewhat in test format. There are four major types of instruments which have been used to assess environmental quality: (1) observational procedures, (2) interview procedures, (3) children's reports of parent behavior, and (4) performance tests. The present report, however, focuses on only the first two. Important data has been obtained using both children's reports (Schaefer, 1971) and performance tests (Hess, Shipman, Brophy & Baer, 1969; and Solomon, Houlihan, Busse, & Parelius, 1971). Nonetheless, child reports were excluded because they are retrospective in nature and often show only a minimal correlation with actual parent behavior. Performance tests were excluded because they provide only a narrow view of

the total stimulation available to children in the home. In defense of these instruments, it should be mentioned that they can be very useful for certain research and diagnostic purposes. In fact, more attention should probably be given to the development of new performance measures for both purposes.

Among the observation instruments used, some involved interaction analysis type coding (White et al., 1972), some involved checklists about the presence of particular behaviors or conditions (Caldwell et al., 1966), and some involved behavior ratings based on observations (Baldwin et al., 1964). For certain research and diagnostic purposes, detailed coding of certain interactions would seem particularly beneficial. For research where environmental quality is not the major variable of interest and for most applied purposes, interview techniques and brief observational procedures may be most feasible. What seems especially needed now are instruments which require relatively little time to give and relatively little training to administer and interpret. Such instruments could be usefully employed by a variety of practicing professionals (eg. teachers, nurses, social workers, counselors, etc.) to gather background data on children. The environmental data obtained may provide a useful complement to educational and health data.

Populations Studies

Some of the instruments reviewed were designed for use with a rather restricted age range (White et al., 1972; and Caldwell et al., 1966) while others have been used to assess the environment of children throughout their childhood years (Baldwin et al., 1945; Crandall & Battle, 1970; and McCall et al., 1973). As mentioned earlier, most types of environmental stimulation are not likely to be strongly associated with development throughout childhood. Attention needs to be given to establishing which types of stimulation are salient at each age level.

Most of the environmental process instruments have been used with only a limited number of families. Their usefulness with other racial, social class, or ethnic groups is uncertain. A major exception to this general rule is the Caldwell scale. It has been used in several foreign nations and bilingual communities as well as with a

variety of American groups. It would appear important to investigate the validity of environmental instruments for use with various groups since the aim of these measures is to be an accurate index of environemental quality. The extent to which various environmental processes facilitate development in all contexts and cultures has not yet been established.

Psychometric Properties

The psychometric properties of many of the instruments examined are not well established. Inter-rated reliabilities have been reported for several instruments and internal consistency estimates have been calculated for some, but test-retest reliabilities are reported for almost none. The factor structure of most instruments is also uncertain. In a few cases, factor analytic procedures have been used as part of the scale development process; and for some instruments there is evidence of at least a reasonable factorial structure (McCall et al., 1973; Caldwell et al., 1966; and Marjoribanks, 1972). The need to investigate the factor structure of environmental process measures exists since the subscales of some instruments show high intercorrelations. Interpretation with such instruments can be very difficult.

It is probably fair to say that the validity of many environmental process instruments is open to question. Indeed, the validity of most of the instruments reviewed for certain particular purposes (eg. screening, diagnosis, summative and formative evaluation) has not been adequately demonstrated. Some scales report correlations with SES measures and all report correlations with measures of child competency. However, almost no additional criterion or construct validity data are reported. Again, a major exception is the Caldwell scale. In defense of most tests, they have been used primarily for research purposes. The test developers have made no claims that the tests can be used for other diagnostic, prescriptive or evaluation purposes.

Purposes and Uses of Environmental Instruments

Related to the issue of validity is the purpose and use of environmental process measures. As stated above, most have been used exclusively for research purposes. The Home Observation of Measurement of the Environment (Caldwell et al., 1966) has also

been used for screening and evaluation purposes. More attention to applied uses of environmental process instruments needs to be given. They are potentially useful in screening homes "at risk" for developmental problems. They might also be useful diagnostic tools as a prelude to placing children or families in certain educational or therapeutic programs. Finally, environmental process measures might be useful as a basis for prescriptions in family training programs and as a means of evaluating effectiveness of such programs (Hamilton, 1972).

Relation of Environmental Processes to Other Variables

Several conclusions can be drawn about relations between scores on environmental process measures and measures of other variables. First, environmental process measures generally show moderate correlations with SES measures. There are, however, some exceptions (Deutsch et al., 1967). Second, it appears that homes from each SES level vary in terms of the quality of stimulation they provide. Third, environmental process measures show a consistent and substantial relationship to measures of child competency. Indeed, a significant relationship between the two variables has been observed using a variety of process measures, a variety of child competency measures, and a variety of subject populations. Moreover, it appears that a substantial residual relationship remains between the quality of stimulation in the home and measures of child competency when SES is controlled.

Environmental process measures may also be more consistent predictors of competence across ethnic groups than status measures. That is, certain parenting skills, etc. may be strongly related to child competence regardless of ethnicity. By contrast, SES is more likely to be confounded with ethnicity (Havinghurst, 1976). Thus, SES may show a relatively low correlation with competency in some ethnic groups and an artificially high correlation in mixed groups. In the latter case it may provide misleading information as to the need for certain types of intervention.

With regard, to relations between environmental process measures and other variables several questions remain unanswered. Among the most critical is the relation between environmental processes and parental IQ. Clearly there is a relationship

between parent IQ and the quality of stimulation found in the home. As a rule, brighter parents are almost certainly going to be more competent in their child rearing practices. The question unanswered is whether certain environmental measures are basically estimates of parent IQ and what is any residual relationship would remain if parent IQ were controlled when examining the relation between environmental processes and child growth. A related question worthy of additional investigation is whether environmental process measures afford better prediction of child competency than a combination of parent IQ and SES.

Even if child competency can be predicted as well by parent IQ, however, it would not obviate the need for environmental process measures either in terms of their conceptual advantages or in terms of their practical advantages. First, while environmental measures may function as estimates of parent IQ, they are not equivalent to measures of IQ. Clearly environmental process measures per se are not adequate as measures of parental intelligence. They deal with a very limited range of human capabilities. However, environmental process measures are probably more adequate indices of child rearing competency than are measured of general intelligence. Specifically envirnmental measures are probably better indicators of how mothers manifest their child rearing competency. In practical terms, even when maternal IQ is known, environmental process measures probably provide an important kind of information regarding whether a child might need special assistance. Some mothers with high IQ's are probably not competent child rearers while some mothers with relatively low IQ's may be excellent. Further, environmental process measures probably provide more useful information for deciding whether parents need training and what specific type of parent training they need. Relatedly, while it would be difficult to substantially improve the IQ of most adults, many specific child rearing could be learned without great difficulty.

Summary

The development of environmental process measures marks a significant step forward in the assessment of environment quality. As Bloom (1964) predicted, these

measures have made it possible to more clearly delineate the relationship between environment and development.

Although the factorial structure of many process instruments is open to question, there is evidence of substantial empirical validity for most. Greater attention now needs to be paid to establishing the validity of process instruments for specific purposes such as screening, diagnosis, and program evaluation. Environmental process measures have been used with a variety of age and cultural groups. Indeed, most of the studies done outside the United States were not reported in this paper. Adaptations of instruments for use with other groups should be made with caution with emphasis given to establishing the appropriateness of each item for use with a particular age group in a particular social context.

In general, while much additional work needs to be done in developing good environmental process measures, it seems fair to conclude that these measures can be usefully employed for a variety of research and applied purposes. Particular attention should be given to designing short, easy to administer instruments for use in educational and clinical settings. Significant improvements in research instruments may be more dependent on the development of more adequate theories about the relationship between environment and development. In both cases, the use of environmental measures is likely to make a substantial contribution to the adequacy of the information obtained.